

## Scratchbuilding with Photorealistic Card Textures

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11th Australian Narrow Gauge Convention, Melbourne 2013

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Supplementary workshop materials include printed 'kit' sheets in both card and photo quality inkjet paper, development stages of the On30 model/detail parts, and a completed On30 card model in a display setting.

The O scale display setting includes card models of QR cream and navy sheds, as well as fence, posters and backscene. Incidentally, the track allows for displaying standard, 3' 6" and 2' 6" gauges. The navy shed track is 2' 6". A proof of concept HO model (no window shades, etc.) will also be available.

## Computer+camera -> card models!

- Textures—computer-created printable images



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Photorealistic card modelling involves rescaling photos of actual materials (weatherboard siding, metal parts such as brake levers, etc.) to combine with scale drawings to produce realistic surface textures.

Slides or negatives need to be scanned into the computer prior to use while digital photos can be used direct. Photo manipulation or drawing software (2D or 3D) is used to create printable surfaces which, when printed on card or paper, are used to build the model.

## Card textures: Presentation

- Background – my experiences with card
- Research – QR camp wagon
- Modelling with the Computer
  - Surface drawings – every surface & object!
  - Creating textures from photos
  - Combining drawings and textures
- Acknowledgements, thanks, etc.



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## My introduction to 'photorealistic'

- Free downloads: outhouse 1:48 and shed (kitbash trial)



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Historically card models have been either

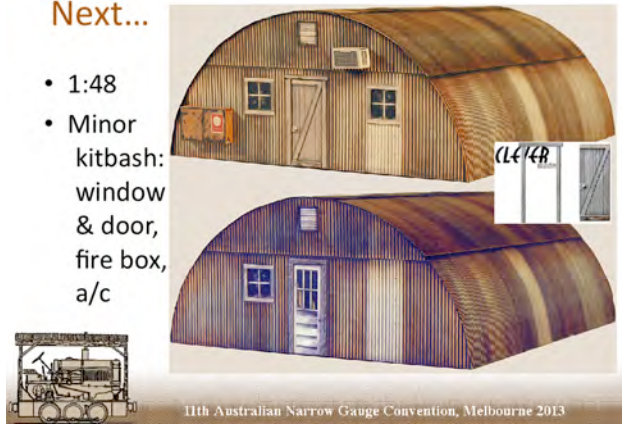
- basically 2 dimensional with mechanical surfaces, or
- effectively paper mache with conventional surface finishing (eg painting)

Paper Creek's free downloadable HO outhouse provided my first photorealistic model and was assembled with minimal 3D enhancements. Even at that it's quite realistic behind another structure.

The Clever Models free downloadable garage was my next model, still with minimal 3D enhancements. It also used scale lumber for the rafters as I didn't have enough recent experience with card to create card rafters. However, it was also my first 'kitbash' as I created my own signs for the building.

### Next...

- 1:48
- Minor kitbash: window & door, fire box, a/c

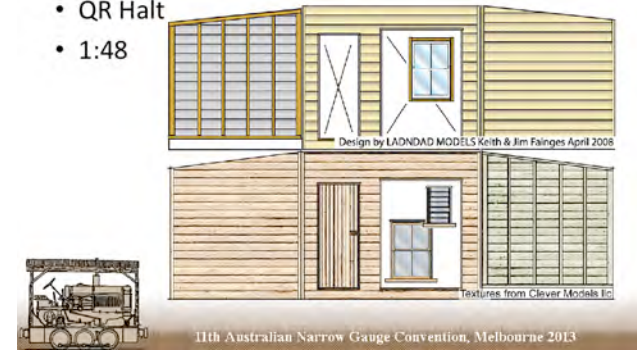


This is a purchased kit with some kitbashing... roller door on one end replaced with a pedestrian door and window removed. The appearance is enhanced by the layering of corrugated sheeting, door and window trim (see inset), etc. The air conditioner is one of the kit details and should have been fitted into the wall, rather than hanging off the surface.

The fire equipment box is scratchbuilt.

### Then kitbash to photorealistic...

- QR Halt
- 1:48



The QR halt is one of Jim Fainges' kits. I've taken his dimensions and replaced the mechanical textures with photorealistic textures taken from a purchased Clever Models CD.

## Ready for installation...



The interior is fully finished and the structure simply requires stumps/ steps or a foundation for installation on a layout. A station nameboard on each end might be appropriate for some locations, but a freestanding sign was more common.

The boxes are scratchbuilt and printed with fictitious names suggestive of local area businesses.

## Scratchbuilding: start small...



The packing boxes on the previous slide were an easy way to get serious about scratchbuilding... they required designing the box/tabs for folding, adding the surface texture and lettering (rotated for some surfaces).

The signs came from personal photos (Stop, RR Xing, photographer) or downloaded from the net (toilet signs). The doors and windows came from Clever Models details.

The Coke machine is a complete scratchbuild, using a photo of a workplace machine and the logo from the CCA web site. The picnic tables are also completely scratchbuilt, using a design that I built many years ago for our recreation cottage. The two different colours results from using the computer to replace one dominant colour in the texture with another.

## More

- Complex
- Detail
- Patience



A description of this kit's development is in a recent NGDU article. As can be seen from the gate images, a photograph of an existing structure provided the timber spacing and texture. Construction used individual 'boards' assembled on the 'X' of the cross bracing.

The rest of the structure, with a sign on one end and the weathering along the bottom of each wall, uses Clever Models corrugated sheeting textures. For copyright reasons the sign is not included in the distribution kit.

## Major learning experience...

- Several 'builds' to get a satisfactory model w. 3D layering, window canopies, guttering, etc.
- Stumps
- Partial interior
- LED light



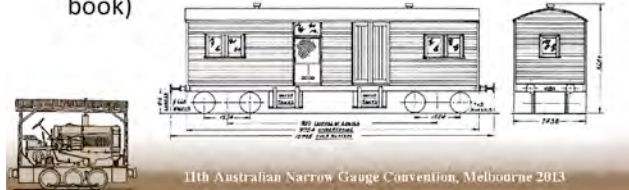
This structure was actually built before the navy shed in the previous slide and the techniques developed experimentally here are evident there.

The railing, for example, allowed me to develop skills that led to the individual board construction of the navy shed gates and the weathering of the porch floor was practice for weathering ground level corrugated sheeting.

The draperies here all came from the web and were resized to fit the windows. A LED light provides illumination on the porch and the ability to see that the sleepout has a fully modelled interior.

## Research: QR Campwagon

- 32' underframe (drawings & cast resin model)
- Photos, photos and more photos
- QR wagon lists, timber wagon details, etc.
- Campwagon outline drawings (Rollingstock book)



A QR wagon model was suggested as a way of localising and providing a scale for viewing my Capricorn Sugar Rail Museum... too many viewers had been unable to understand the scale (1:48) when many of the models were smaller than those on nearby HO exhibition layouts.

Modelling a camp wagon was a logical place to start as they are still found at many rail heritage museums and tourist railways. Since at least newer ones are built on standard 32' QR underframes, research and development should be applicable to other QR wagons of the same era.

## Model specifications...

- Standard 32' underframe, for use with other 32' wagons by replacing solebar (side) texture
- Composite model with fictitious number: gas cylinders, chamferboard siding, water tanks, hand brake mechanism, buffers, truss rods
- Layered 3D finish, doors closed (no interior or lighting), weighted for operation with bogies



I'm not a 'rivet counter'—my models are designed to be representative, rather than being a specific vehicle/structure at one specific point in time.

Techniques and detail materials (chamferboard siding, brake levers, buffers, etc.) needed to be reusable for future models, with the only change being 'colour replacement' when necessary (eg QR's gray freight wagons).

## All surfaces drawn to scale using computer image manipulation

- Scan paper-based drawings, rescale as needed
- Use 'layer' function and 'trace' lines to obtain properly squared drawing [Photoshop: bitmap versus vector software]



**Bitmap images** (jpeg, tiff, etc.) result from photo manipulation software. Vertical and horizontal lines will have sharp edges but diagonal lines can be quite jagged. These images can be scaled but the lines will be scaled at the same time. Small details disappear when reducing (eg O to HO scale) and jagged lines become more obvious when enlarging (eg HO to O scale).

**Vector images** result from drawing programs. Lines are defined with a particular width running between start and finish points. While details can still disappear when reducing, lines will be cleaner and remain a consistent width.

## Photo to drawing/textures

- Digital or scanned photo—straighten and remove parallax 'skew'
- The grid (on 2<sup>nd</sup> layer) aids in squaring image
- Use to locate details not on drawing



Every surface requires a drawing combined with the associated texture (s).

I consider mounting tabs to be optional... sometimes I'll start with tabs in one direction and then use another for the finished model, just depending on how I assemble the major components.

## Integrity in the details...

- Drawbar takes strain lengthwise, cross bars laterally



This was my design error, the result of a misunderstanding about how wagons were built. Fortunately a QR carriage builder set me straight in time to make corrections for the final build.

Multiple builds are required for all but the simplest models. In the cottage, for example, I missed a wall segment in both the first and second builds, resulting in a gap between the top of the porch roof and the main roof.

Multiple builds were required for this model to correct the underframe and to develop techniques for modelling the chamferboard and brake lever assemblies.

## Cloning chamferboard texture

- Photo
- Squared
- Cloned
- Scaled



Getting a reasonable texture is the first step... I started with a photo of one section of a wagon, squared it up and scaled it to the width of a board, then pasted/combined several copies of that section into a texture that would cover a complete wall (ie roughly 36 scale feet long and 9 feet high for this 32' model).

Some additional cleaning up was also required to eliminate too many obviously repeated details (board defects, nail holes, etc.).



## Photo sourced details...

- Take photo 'square on' to minimise skew
- Isolate required element and skew/scale to fit
- Paste into place on drawing or layer on model



The brake lever, for example, required mirror image components for the back side.

One gas bottle compartment print was glued to the back side of the wall base, with an opening through to the front surface. The bottles were cut out and pasted to that print and a couple of layers of the frame and door (with the opening over the bottles) completed the 3D look.

Note that all exposed edges were coloured prior to installation to avoid white card being exposed.

## ... and constructed

- Surfaces are still photorealistic textures such as painted metal, etc.



The buffers are assembled around a small brass pin... the pin goes through one round buffer texture layer and another is glued over the top to produce a slightly convex surface. The cylinder and sleeve are formed by winding and gluing strips of coloured metal texture around the pin.

The kingpin assembly is built around a small nail using styrene.

## The chamferboard challenge...

- Background print on cardstock, 2/3 wide strips
- Single board width (photo quality paper) strips pressed into gap
- Add windows, etc.
- Trim to install



The base here is a side printed on card. Strips of card, 2/3 of the width of a board and coloured with a black felt pen on their bottom side and edge, are glued along the bottom of each chamfer board on the print.

The 3D surface is created by gluing individual board textures (printed on photo quality inkjet paper) in place, with the shadow of the board above along the top of each board. The top edge must be carefully rolled into the depression left from the underlay strips to 1) achieve the proper board profile and 2) avoid scratching the printed texture.

Window frame overlays, etc., need to be installed after the wall is sheathed, and a window texture placed behind the base wall. Obviously transparent or translucent material could be used instead of the window print if interior visibility was desired.

## Wagon construction...

- Construction is fairly conventional aside from photorealistic textures—white glue, box with cross bracing, balsa stripwood for corners, etc.
- Last step is to weatherproof with spray lacquer



Assembly of the model follows conventional practice and is little different from the card models I built in the 1960s.

The roof has a card sub-roof cut 'neat' with the outside of the walls. The roof itself is double-sided with a corrugated sheeting print on each side and overhangs the side and end walls.

## QR cw 822 Completed!

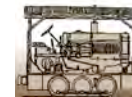


The difference in colour in the two views is simply from differences in the lighting when the images were taken, accentuated by my image processing on the computer.

The metal bogies are from O-Aust Kits and are appropriate for a QR wagon of this era.

## Scratchbuilding takes time!

- My scratchbuilt models have generally also resulted in a downloadable kit, thus a need for quality research and careful development
- Quality = well drawn plans, textures and assembly procedures
- Almost every model has required at least 2-3 'builds' to resolve problems



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I started designing and building Queensland specific models because I was unable to find appropriate commercial kits/models. My interest is in model building, rather than running trains, and I have never finished a significant home layout.

Models developed using these computer-based techniques result in a number of files that can either be deleted or distributed for use by other modellers. I'm not interested in losing money from a byproduct of my own modelling (think company number, GST, BASS, etc.) so the model components are made available for free download from the CaneSIG and Modelling the Railways of Queensland Convention web sites.

## Acknowledgements

- Queensland card kit designers and builders: Jim Fainges, Ron Aubrey & Bill Blannin
- Clever Models llc of USA: modelling ideas, kits (download & CD), photorealistic textures
- Terry Olsson & others for photographs
- Other modellers and suppliers who have assisted in my modelling endeavours; and your encouragement through the convention



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Model building is seldom a solitary exercise! I've been fortunate to have many modelling friends/colleagues who've assisted me over the years.

## Happy Modelling!



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Should have scanned this texture sheet on which I was assembling the double door components, rather than taking a photo under poor lighting!